



NC Radon Program

NC Radiation Protection Section
Division of Health Service Regulation
DHHS

www.ncradon.org





Take in a Deep
Breath!



Blow It Out!!!

Dust...Mold Spores...Viruses...Radon...Carbon Dioxide...Oxygen...Germs.

Things you
just Inhaled!

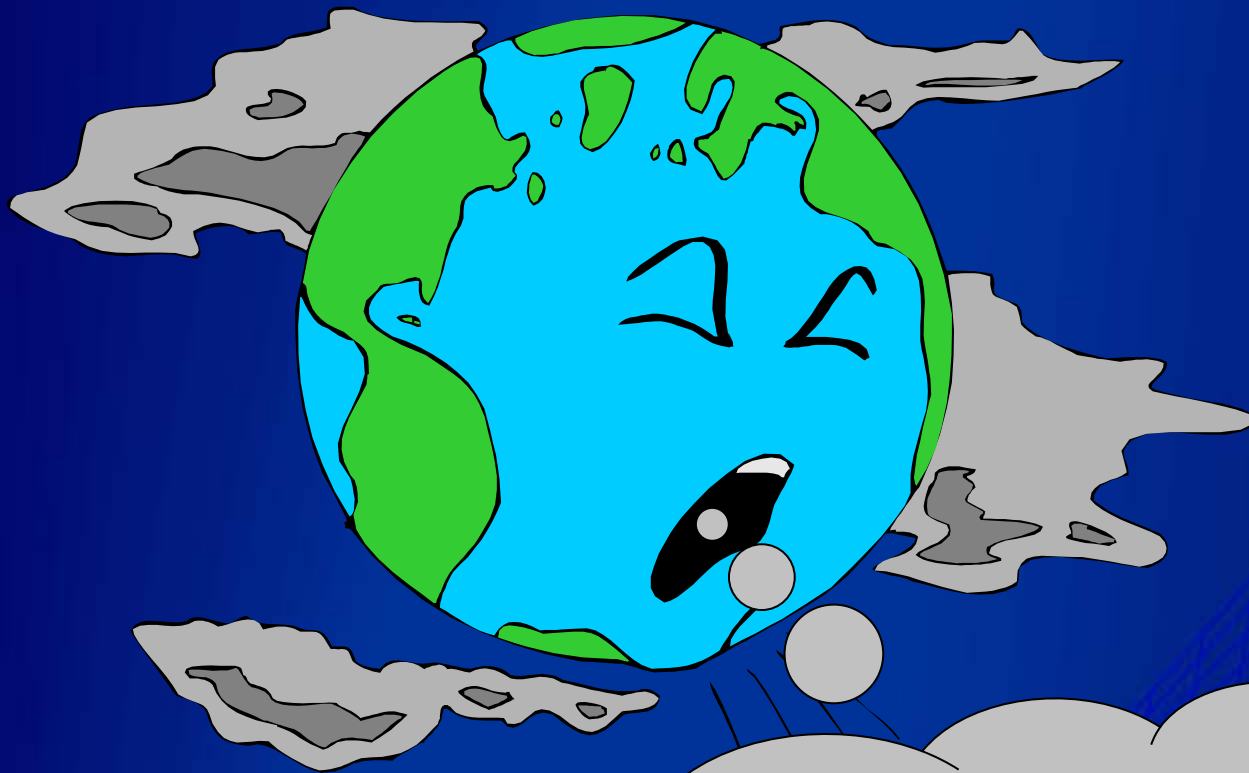
CAUTION



RADIOACTIVE MATERIALS

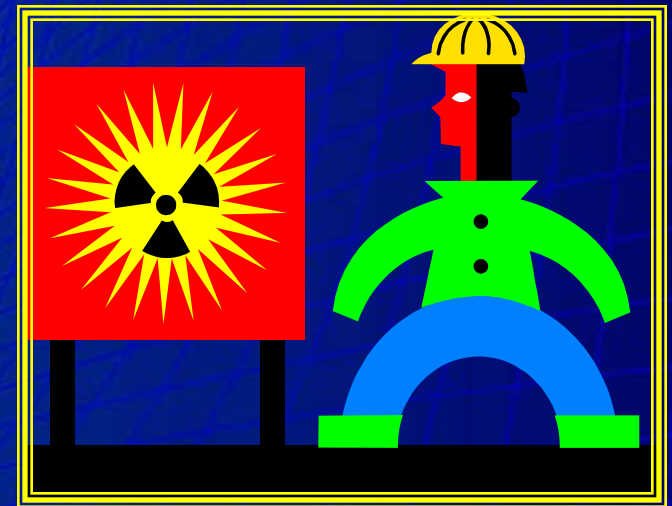
What is it?... Where does it come from?...How does it affect me?...How do I prevent it?..

Radon

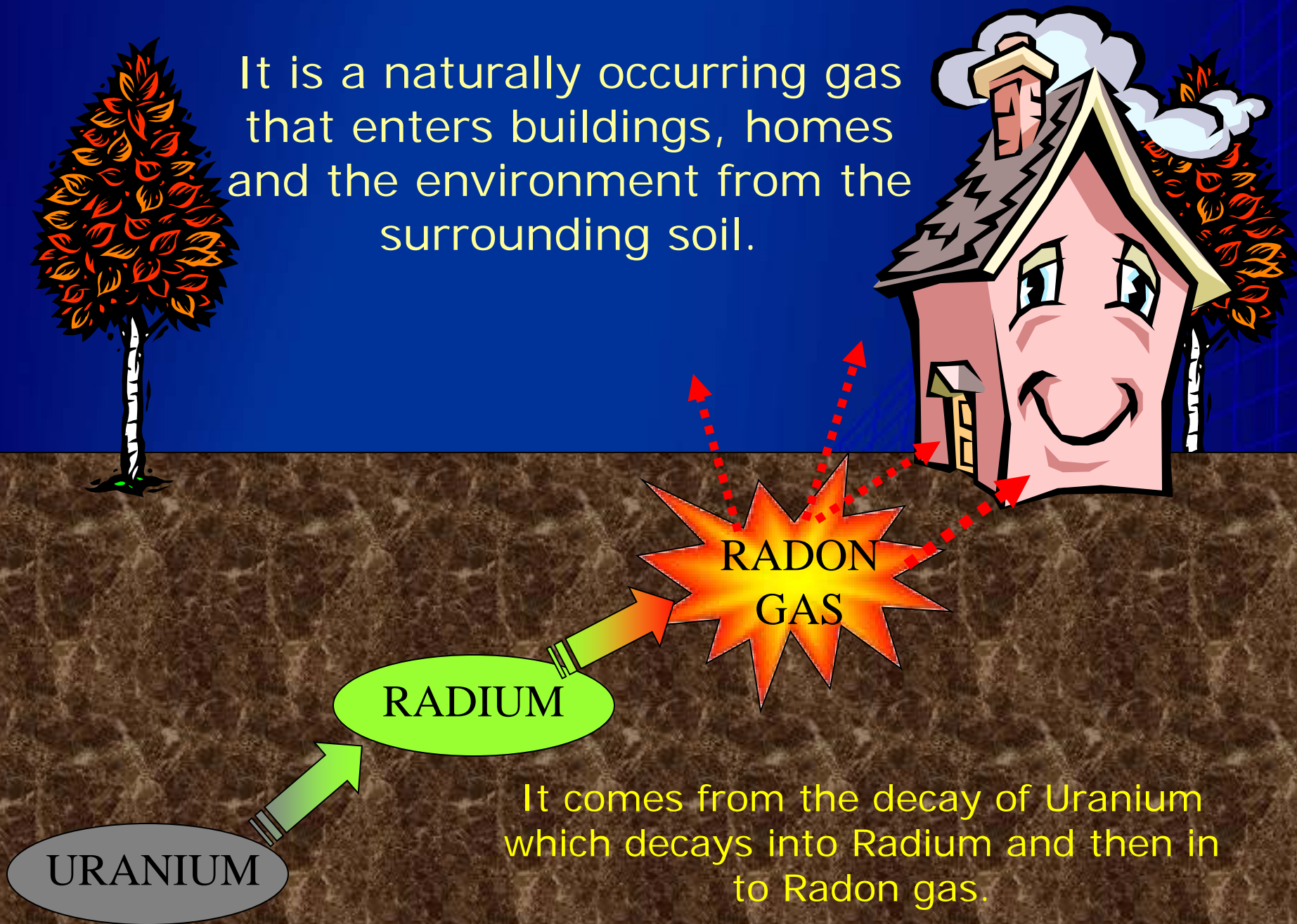


Radon is a naturally occurring gas emitted from the earth.

Radon is a
colorless,
odorless,
tasteless,
radioactive
gas.

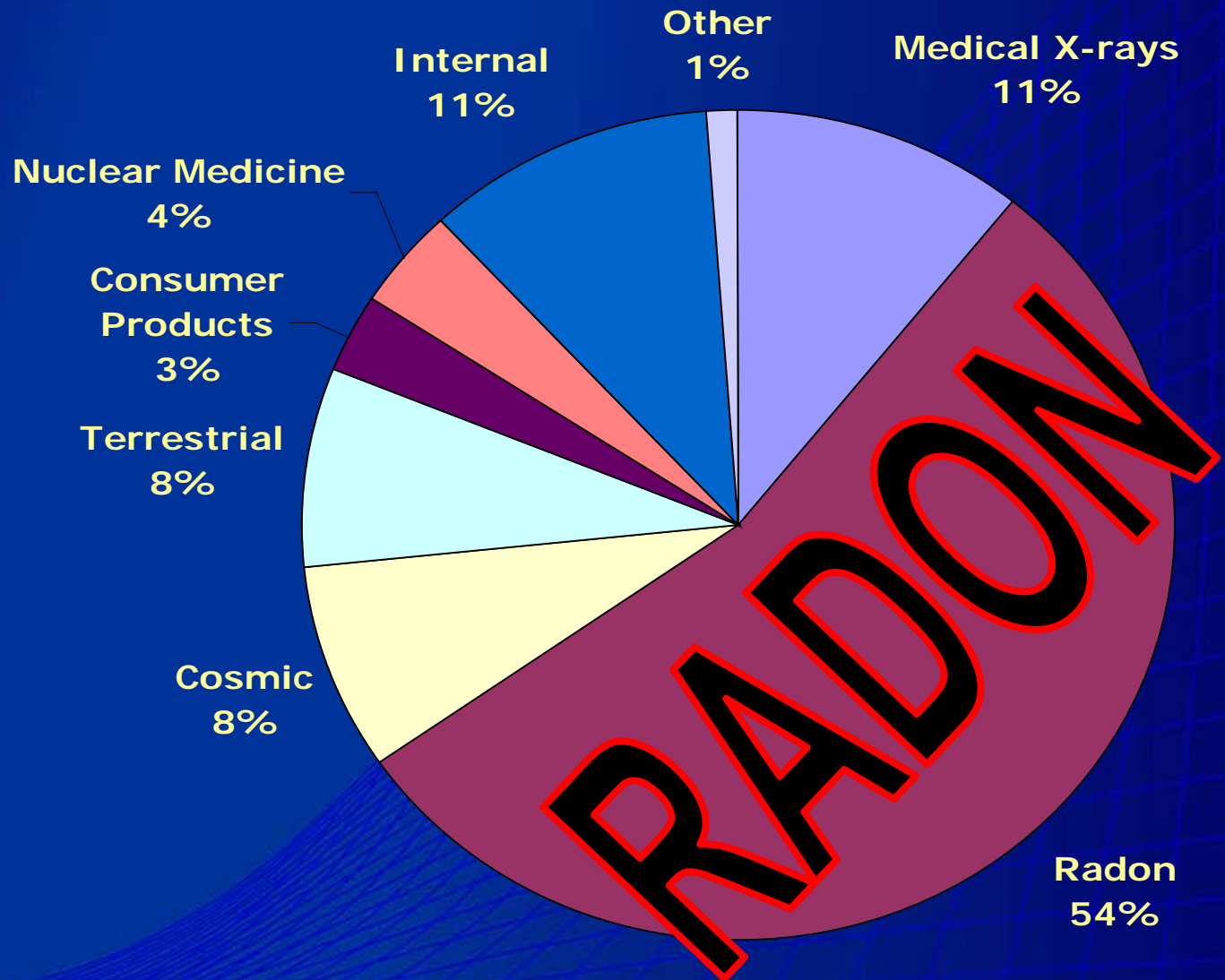


It is a naturally occurring gas that enters buildings, homes and the environment from the surrounding soil.



It comes from the decay of Uranium which decays into Radium and then in to Radon gas.

Sources of Radiation in the USA



Typical Annual Radiation Exposure ...



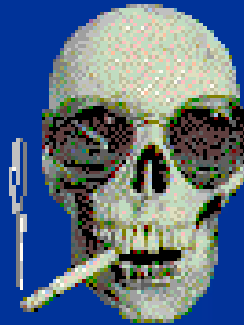
Annual Exposure from Common Activities

Diet

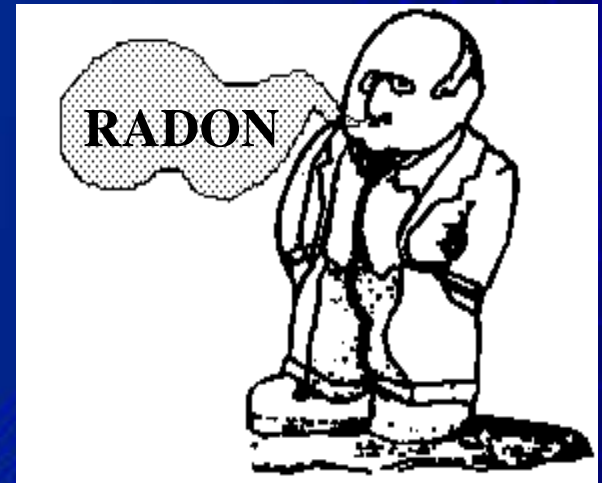


40 mrem

Smoking



5000 mrem



200 mrem

Watching TV



0.7 mrem

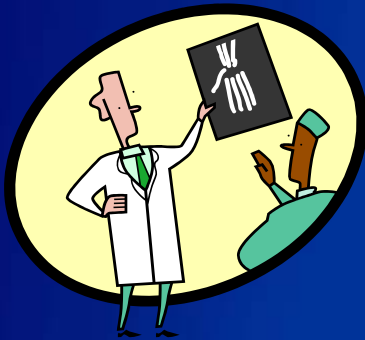
Natural Gas



9 mrem

Annual Exposure from Common Activities

Medical



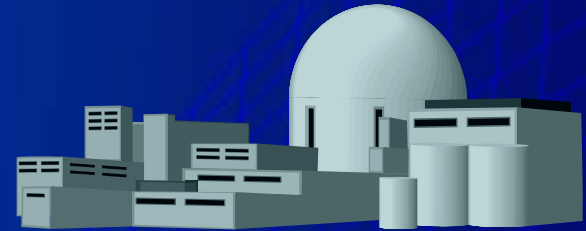
53 mrem

US Flight



5 mrem/trip

Nuclear Power



<0.05 mrem

Building Materials



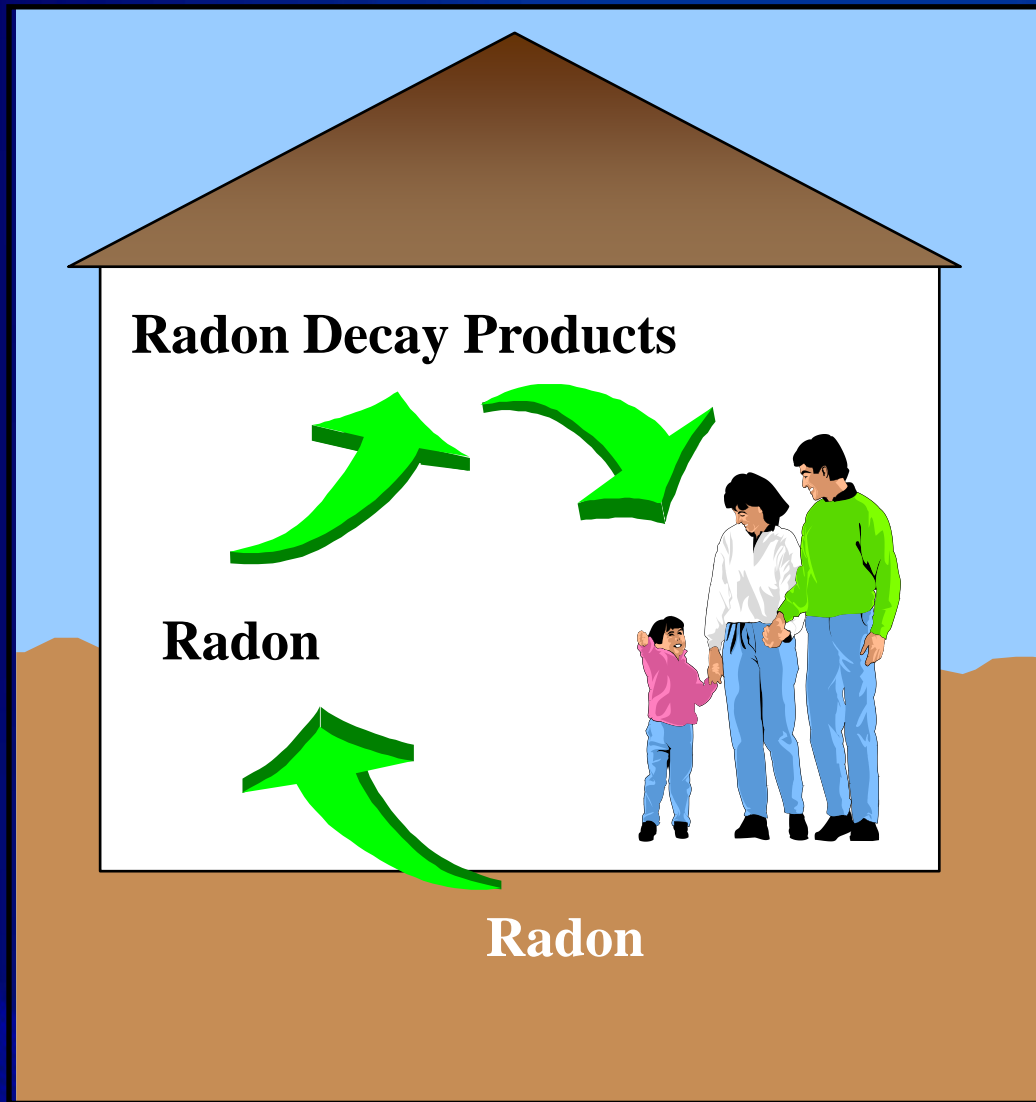
7 mrem

Airport X-ray



0.002 mrem

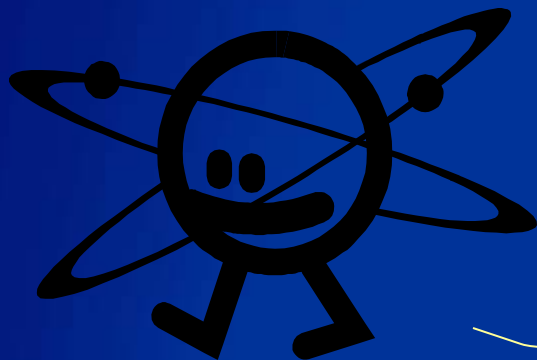
Why are we concerned about Radon?



Radon decays into radioactive particles known as Radon Decay Products or RDP's. RDP's are easily inhaled and deposited in the lungs where they can damage sensitive lung tissue.



Danger of Radon



Radioactive decay
of Radon atom

Emits α radiation

Emits γ radiation

Radon Decay Products

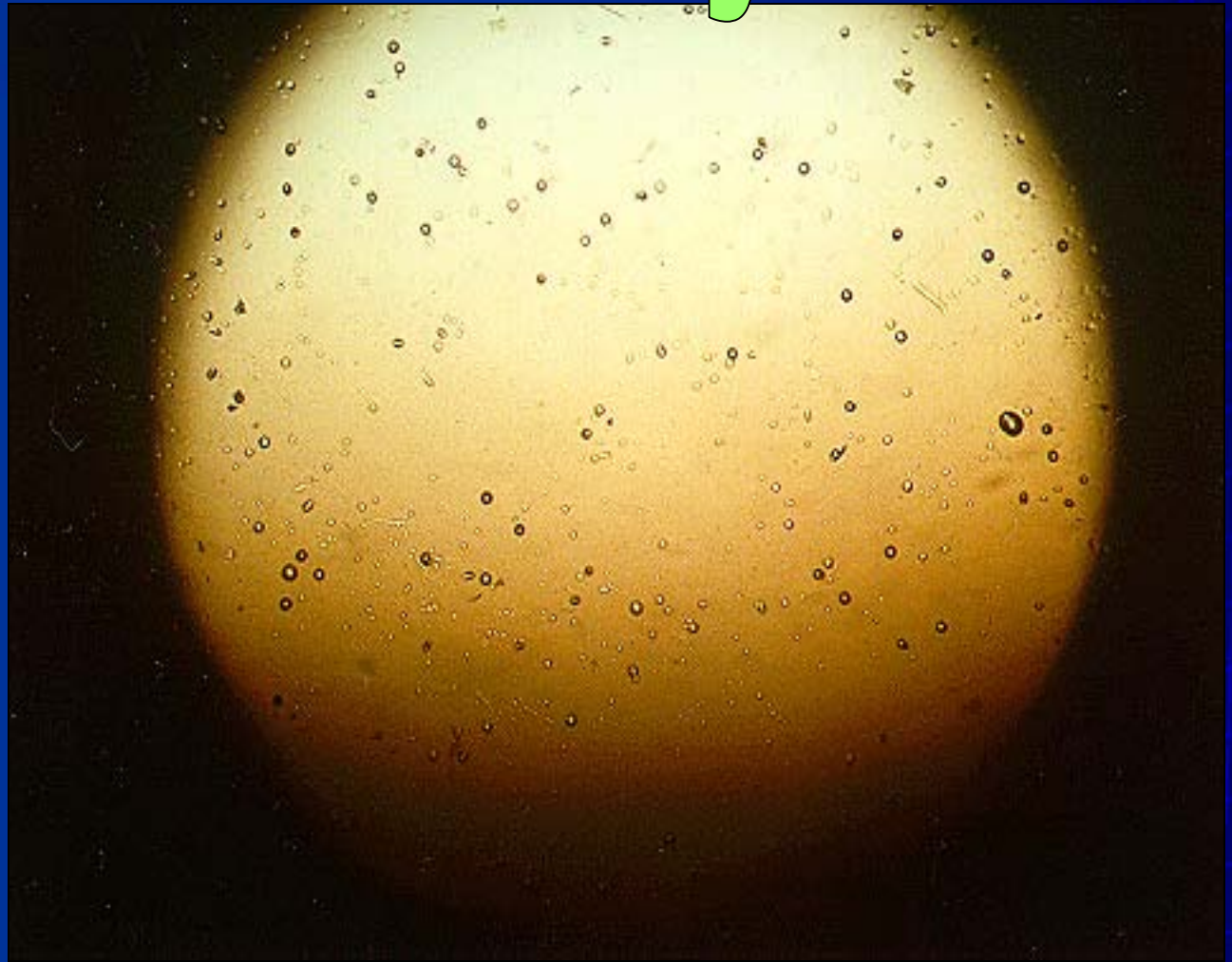
↳ Polonium 218

↳ Polonium 214



**What is the big deal
with these alpha
particles?**

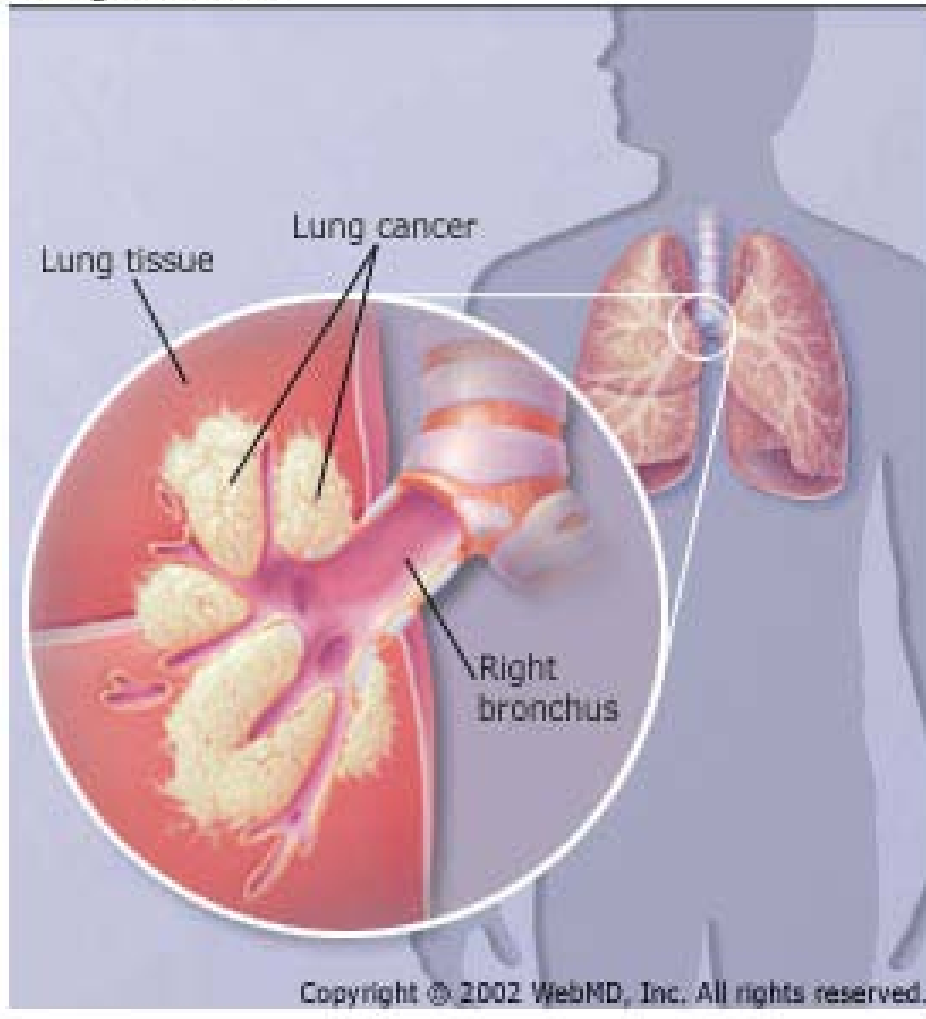
Alpha Particles Are Strong Enough To Pit Plastic!



- Plastic chip from passive radon test (alpha track)
- Magnified only 100 times
- 3 months at EPA Action Level of 4 pCi/L

What Happens When Radon Decay Products Are Inhaled?

Lung Cancer



- Highly radioactive particles (RDP's) stick to lung tissue, where they can irradiate sensitive cells.
- Radiation can alter the cells, sometimes damaging the DNA of the lung cells, thus increasing the potential for cancer.



Danger of Radon



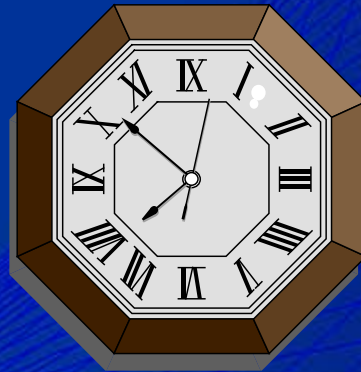
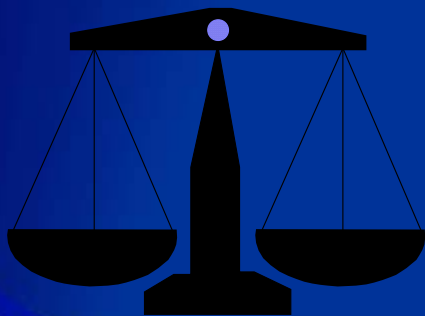
Radon Exposure is
the Second Leading
Cause of
Lung Cancer!



Lung Cancer Risks Due to Radon

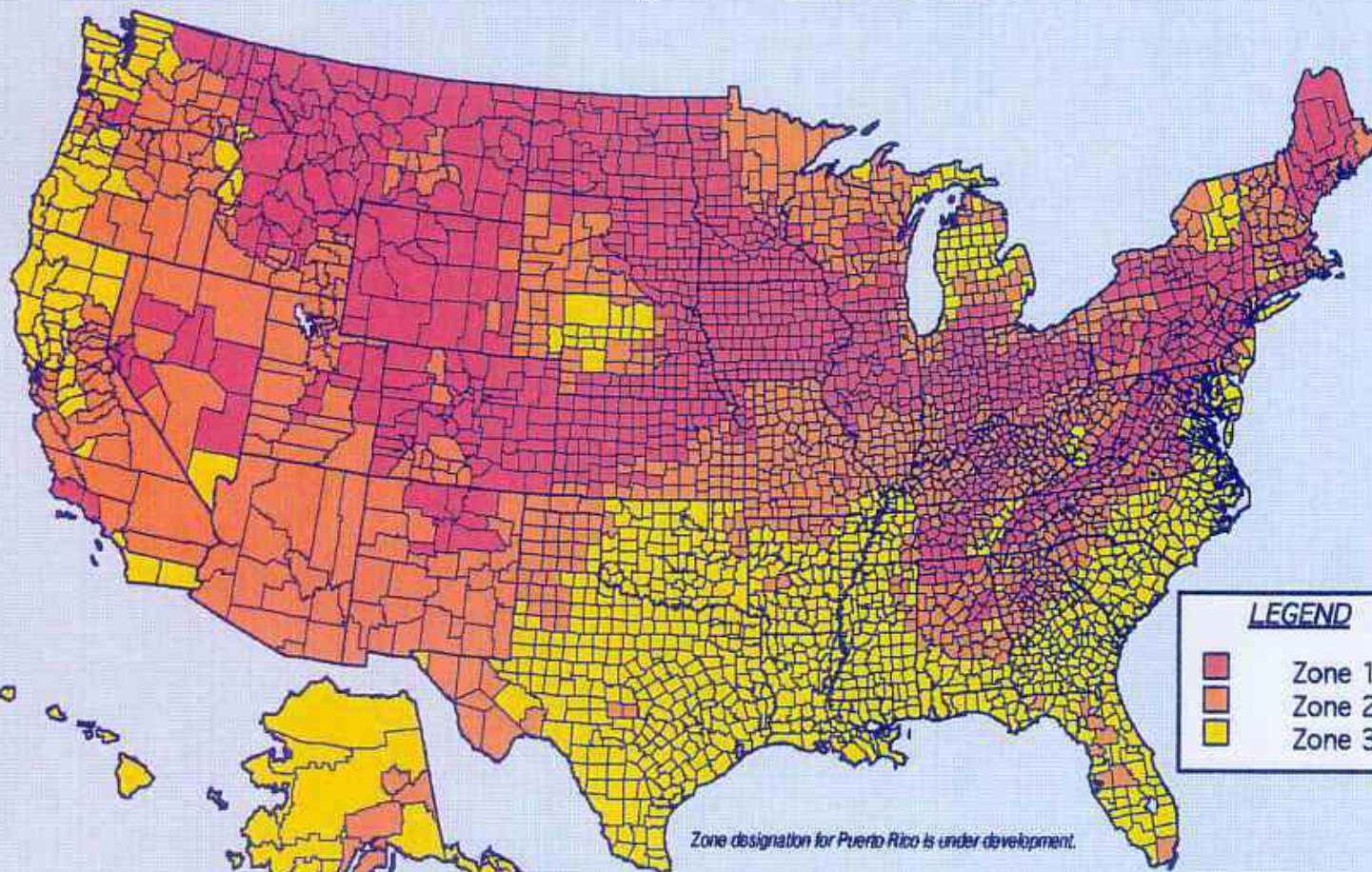
Depends largely on:

- ☛ Quantity of Radon
- ☛ Amount of time spent in home
- ☛ Smoker vs Non-Smoker



**Radon is a
National
Problem...**

EPA Map of Radon Zones



LEGEND

- Zone 1
- Zone 2
- Zone 3

Zone designation for Puerto Rico is under development.

The purpose of this map is to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. This map is not intended to be used to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones. All homes should be tested regardless of geographic location.

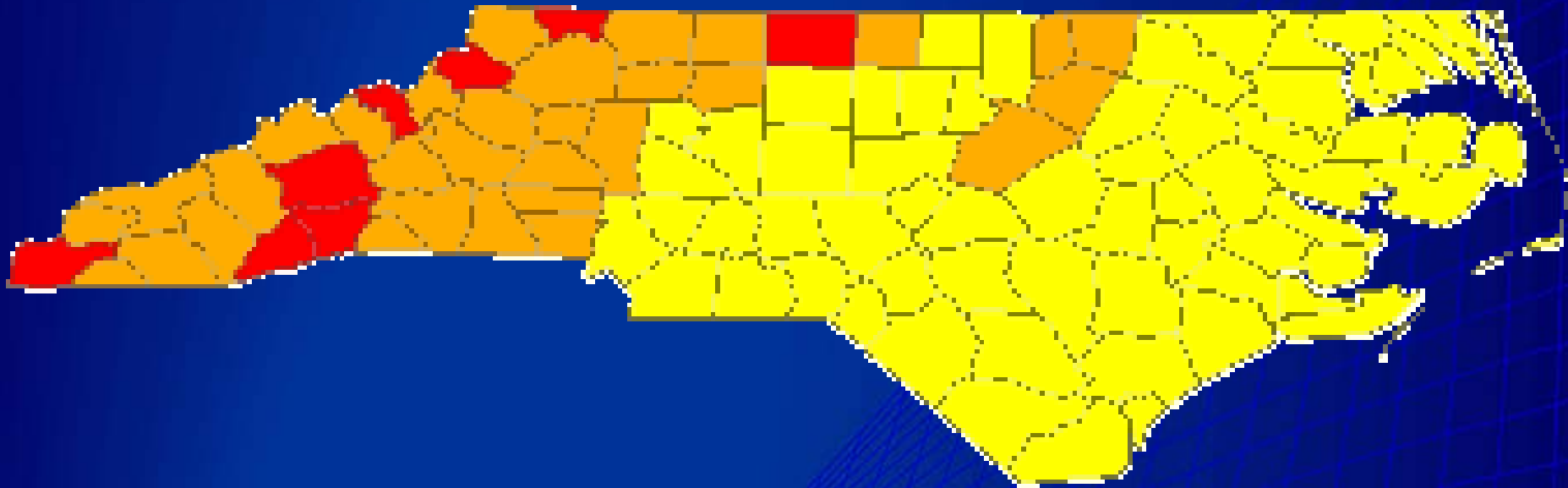
IMPORTANT : Consult the EPA Map of Radon Zones document (EPA-402-R-93-071) before using this map. This document contains information on radon potential variations within counties. EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.



Guam - Preliminary Zone designation

**Radon is a
North Carolina
Problem...**

Radon Prevalence in NC



Mountains

Piedmont

Coastal



Zone 1: Highest Potential
(> 4 pCi/L)

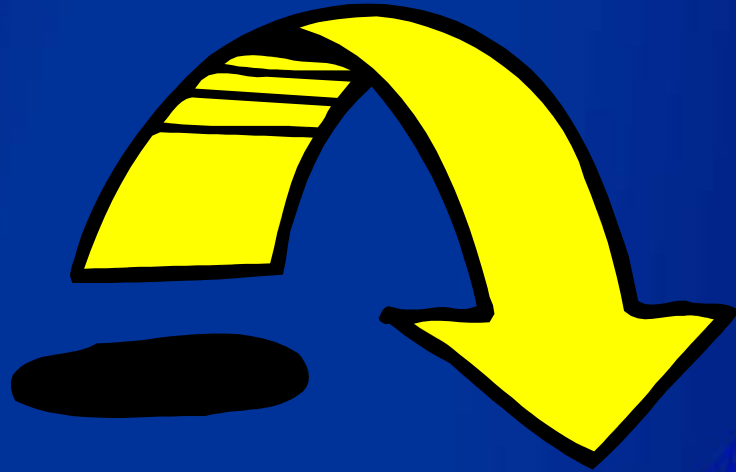


Zone 2: Moderate Potential
(2-4 pCi/L)



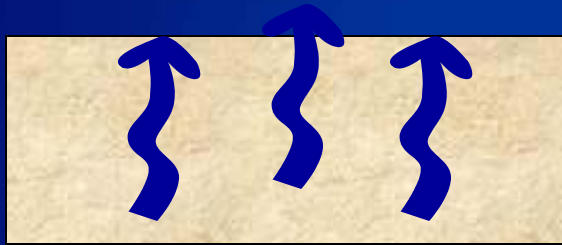
Zone 3: Low Potential
(< 2 pCi/L)

Now that we know sources of Radon...

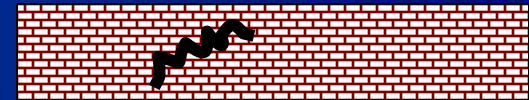


How Does it get into my Home?

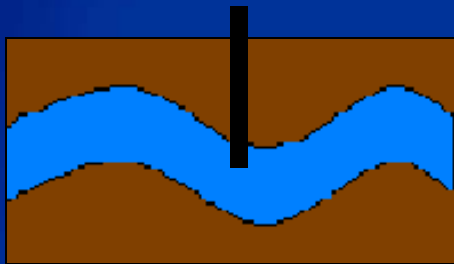




Air movement through soil



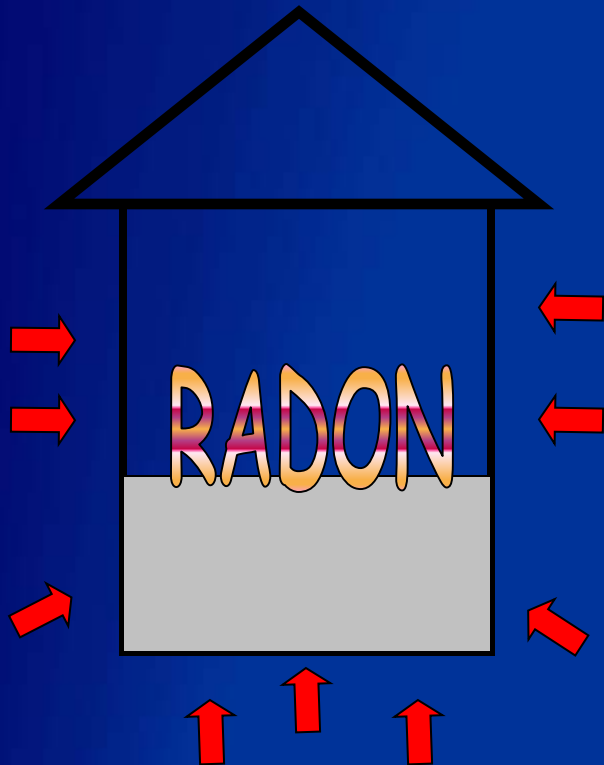
Cracks in foundations



Through well water

★ Also through some building materials (ie. Concrete) that have the potential to contain and emit Radon.

Things that increase Radon Concentrations

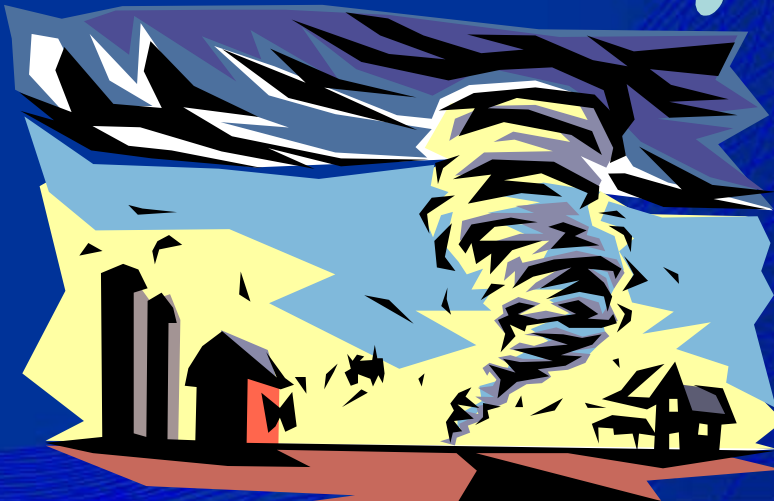


1. Uranium in Soil
2. Permeable Soil
3. Pathways
4. Lower Air Pressure in Home than in Surrounding Soil

How Is Radon Drawn Into A Building?

- Exhaust Systems
 - *HVAC, house fans, etc.*
- Thermal Stack Effect
- Weather Conditions
 - *Excessive rain, snow, wind*

Weather Changes

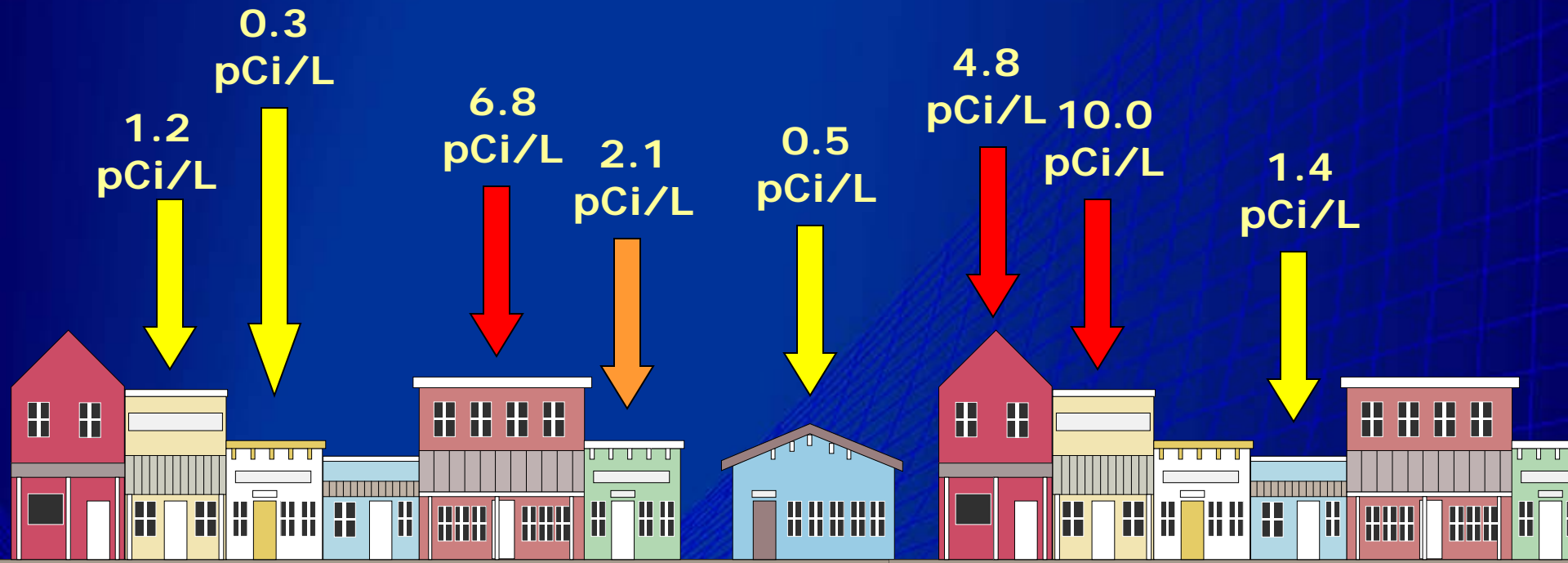




**Fight Radon
Induced
Lung Cancer!**

Encourage Radon Testing!

Everyone Should Test for Radon!



Where can I get a Radon Detection Kit?



- Hardware Stores
- Internet

How much do Radon Detection Kits cost?



Average Costs:

Short-Term Kits: \$10-\$20

Long-Term Kits: \$15-\$25

Radon Testing

Short-Term Testing



Takes 3-7 days

Inexpensive

Easy

Long-Term Testing

Takes 91+ days



Short-Term Testing Devices





Long-Term Testing Devices



My Results are above 4 pCi/L... What do I do now?



Repeat the test in the same location. *(If possible repeat with a Long-Term Test)*

If the second test is above 4 pCi/L...

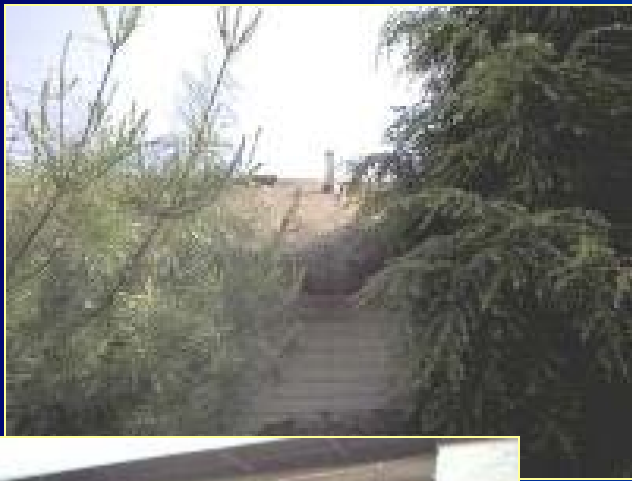
Call a certified Radon
Mitigator

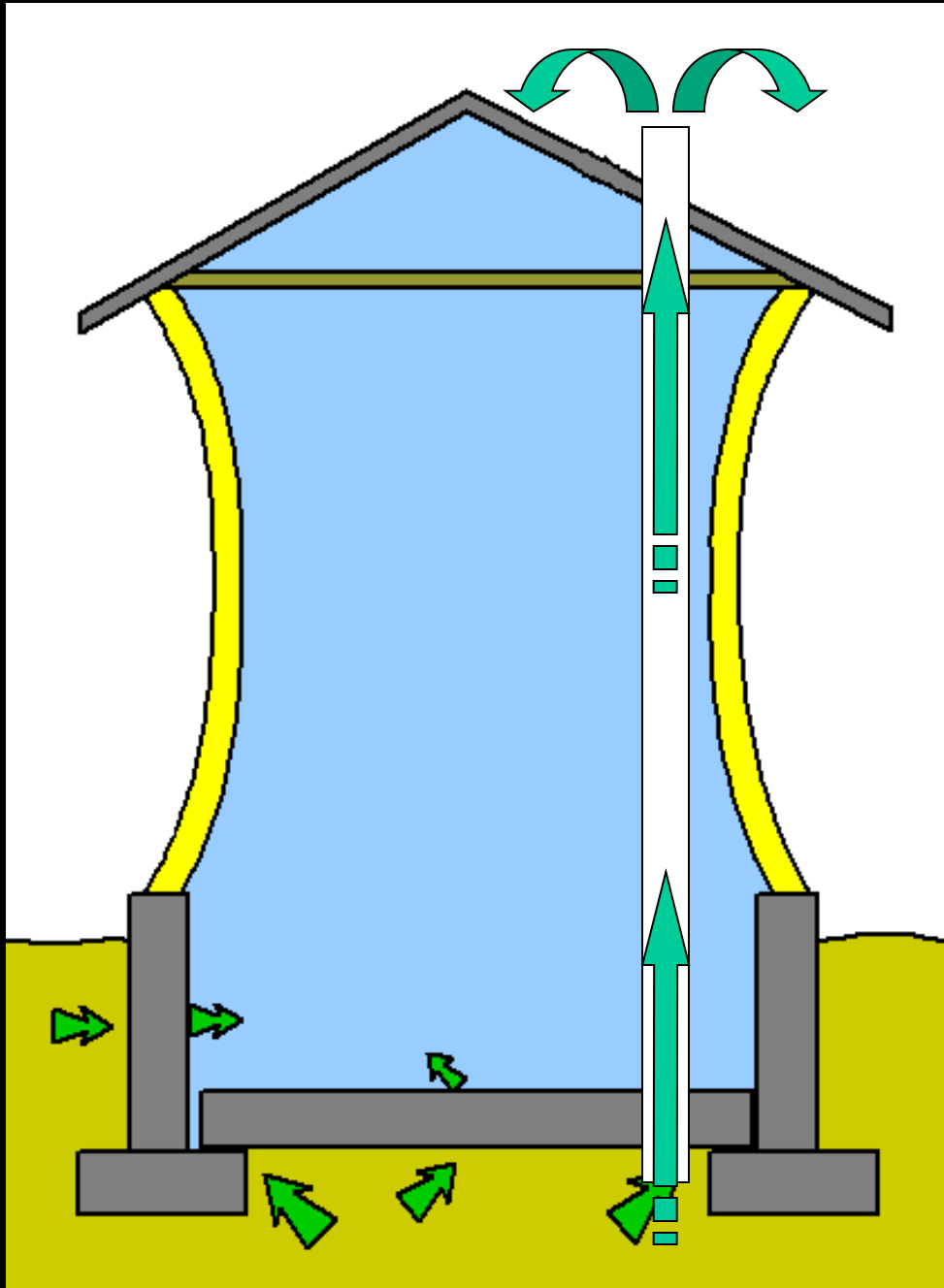
Homes with High Radon Levels can be Fixed!



What is Radon Mitigation?

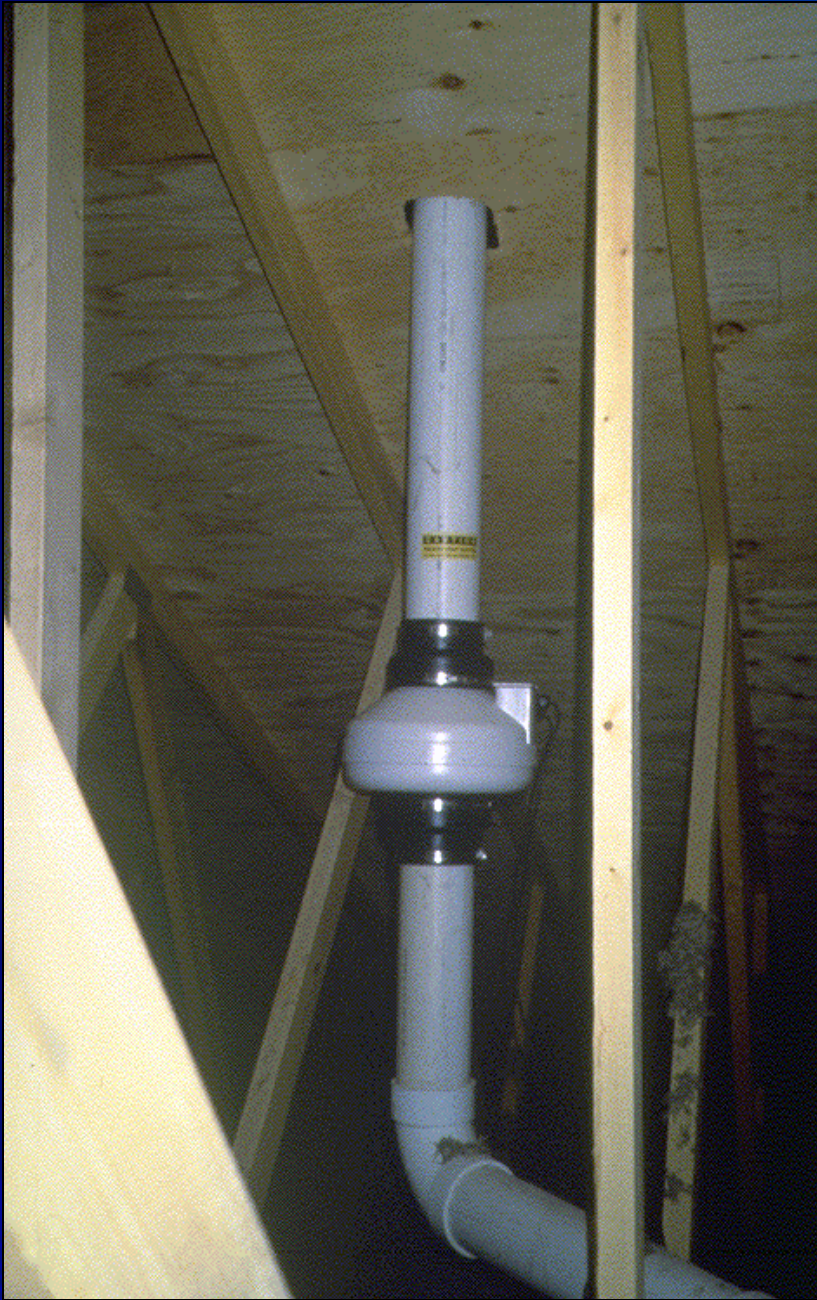
Method of removing Radon from the home via ventilation through a PVC pipe and out above the roof.





**What Does
A Mitigation
System Do?**

What it Looks Like Underneath It All...



Average Costs of Mitigation



Home Under Construction:

Less than \$500

Average Costs of Mitigation

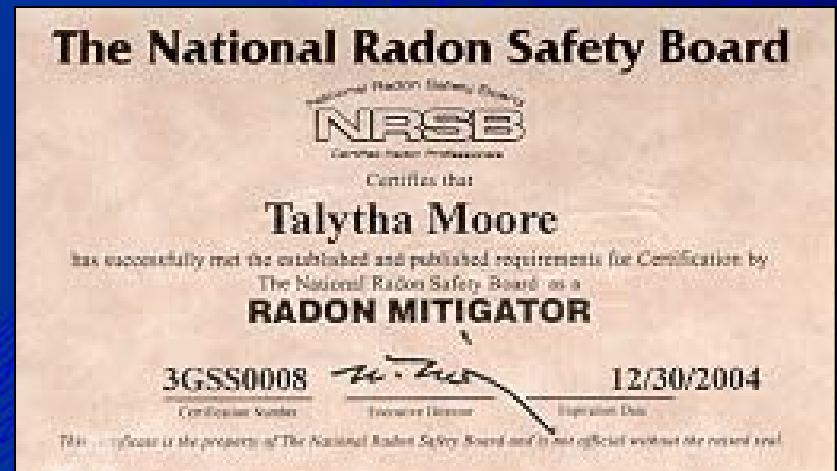
Existing Home:

\$500 - \$2000



What is a Certified Radon Mitigator/ Measurement Professional?

Measurement and mitigation contractors certified by NEHA or NRSB have been trained and carry ID cards.



Benefits of Having a Home Mitigated?

Decrease the amount
of Radon in the
home/building

Improved Air Quality

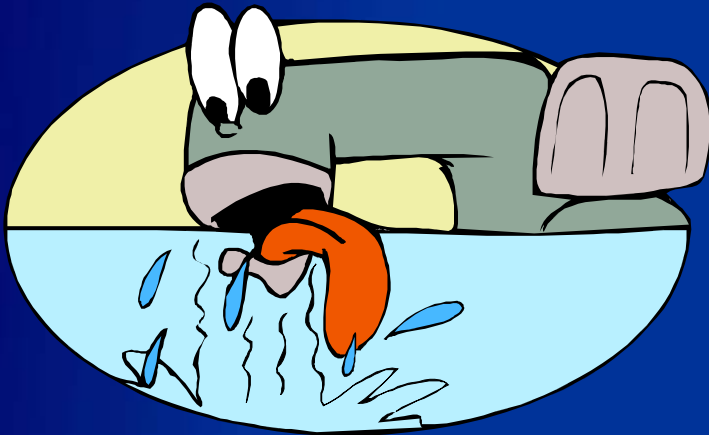
- Decreased moisture
- Decreased mold and other moisture irritants



Radon in Drinking Water



Transfer of Radon in Drinking Water to Radon in Indoor Air...

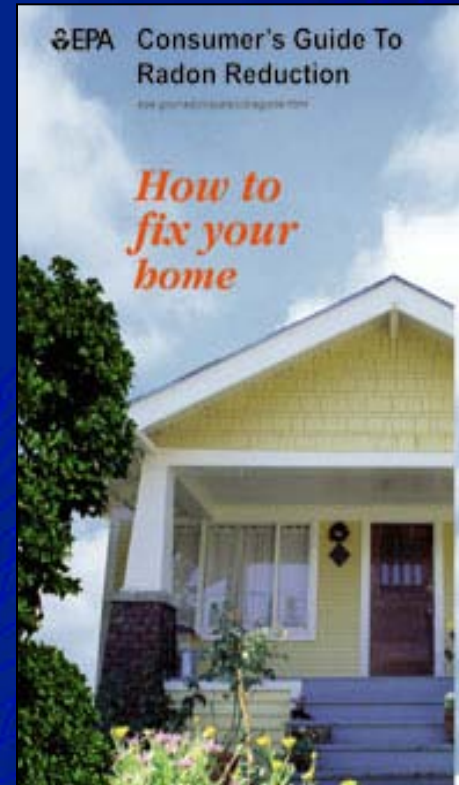
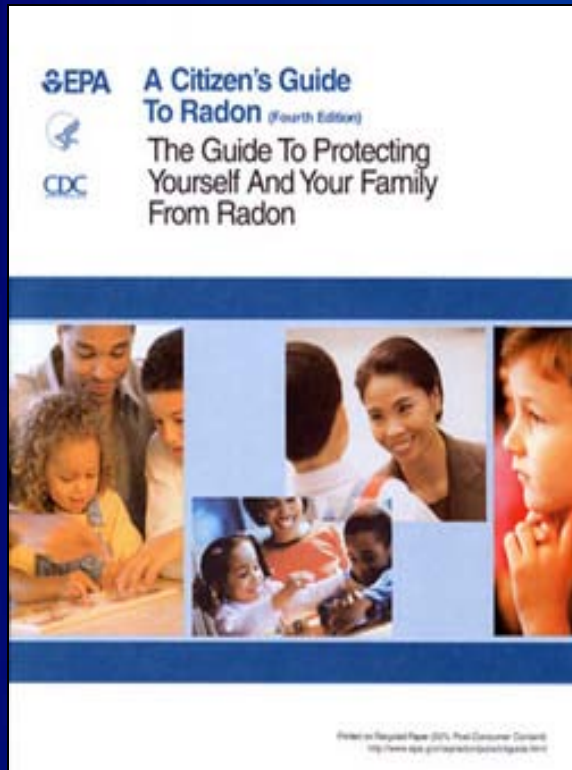


Examples of Radon in Water Mitigation Systems



Images from
http://www.bgctechnologies.com/newradon/h_water_systems.html

EPA Documents Available...



Also available on the web...

www.ncradon.org

Radon Projects



Special Radon Projects in NC

Guilford County

Wake County Env. Health

Wake County Schools

Buncombe County

Division of Water Quality, Asheville

Division of Air Quality, Asheville



Future Radon Projects in NC



We need your
HELP!!!